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small number have the right to push their colleagues aside and say we alone will serve the country.

Mr. Wells asks for inventions; but inventions are only made by those who are aware of the requirements; it is often possible to devise a means to an end when the end is known; but those who might be of use are kept in the dark, very many of us are not allowed to know and to help. Professor Fleming has stated his experience, in the all-important letter which you have published; his authority on matters of wireless telegraphy and electrical engineering generally is indeed properly described, in Lord Curzon's words, as "high, not only in the estimation of this country, but in that of the whole world." I am in the same position as he is. Though I have fifty years' experience as a chemist, particularly in connection with the materials now being used in the manufacture of explosives and of natural and artificial organic products, I have never once been consulted; the only request for my assistance that I have received, since the outbreak of the war, came from a German gentleman long naturalized as a British subject. No doubt, I am properly regarded as merely a retired professor, but I know highly competent younger men among those trained by me who are equally unutilized.

Sir Joseph Larmor pointed out in your issue of March 29 that the country has no use for chemists. Yet we read daily in the papers that the chemist is now the people's darling in Germany, and that the war is a war of chemists; we know that it will be in industry when fighting is over. But in a country which is dominated by the lawyer-politician, in which, to use Matthew Arnold's expression, "the idea of science" is unknown, it can not well be otherwise. We shall continue to muddle along until, having reformed Oxford, we have changed our schoolmasters and the idea of science is abroad; it is perhaps fortunate that it is fast being hammered into us by high explosive shell.

As a fellow of all but forty years' standing, let me say in conclusion that, in my opinion, unless the Royal Society be organized as a whole forthwith in the service of the state, as

well as provided with an efficient active executive in full sympathy with the situation, we shall deservedly sink into insignificance, because the peers of science will have shown themselves to be collectively impotent and without due sense of their public responsibilities.—*Henry E. Armstrong, in the London Times.*

SCIENTIFIC BOOKS

Modern Instruments and Methods of Calculation. A hand-book of the Napier Tercentenary Exhibition. Edited by E. M. HORSBURGH, with the cooperation of others. The Macmillan Company, New York, 1914. Pp. viii + 344. Price \$1.90 net.

It is very seldom that an international congress or a celebration on the occasion of any kind of academic anniversary offers the opportunity for the publication of anything more elaborate than a volume of memoirs. Such volumes are generally well worth the effort, but there is rarely anything unique in the plan, and the publications often serve as a tomb in which various worthy articles are consigned to oblivion. The Napier Tercentenary, however, offered an opportunity for something radically different in the way of memorial volumes. To be sure there is the collection of essays, soon to appear; but the committee in charge of the work hit upon the idea of an exhibition of all sorts of tables and calculating machines, and fortunately found a man well trained in the field of calculation, sympathetic with the historical development of the subject, and skilful in setting forth the description of material, and to this man they entrusted the task of preparing a volume that is quite unique in the history of such congresses.

Mr. Horsburgh had in charge the arrangement of the interesting exhibition in the university, and to some extent this work is a catalogue of the material displayed at that time. It is much more than this, however, since it includes a series of valuable essays describing the tables, the calculating machines of various types, and those instruments which, together with models and other material, enter into the equipment of a modern mathematical laboratory.

Among the special essays may be mentioned the following: "Napier and the Invention of Logarithms," by Professor Gibson, of Glasgow, perhaps the best essay which has appeared upon the great Scotch mathematician; "Notes on the Special Development of Calculating Ability," by Dr. W. G. Smith, an excellent summary of the history and psychology of the subject; "Calculating Machines," by F. J. W. Whipple, a description of the standard engines of calculation written from the standpoint of the practical computer and elaborating the descriptive catalogue prepared for the Fifth International Congress of Mathematicians in 1912; "The Calculating Machine of the East: the Abacus," by Dr. C. G. Knott, the efficient secretary of the Royal Society of Edinburgh, and one of the prime movers in the Napier Celebration—a classical essay upon the subject and one which has been out of print for nearly thirty years; "The Slide Rule," by Dr. G. D. C. Stokes, a historical review of the various types of these instruments; "Integrators," by Charles Tweedie; "Integrometers," "Planimeters" and "Harmonic Analysis," by Dr. G. A. Carse and Mr. J. Urquhart; "Integrating Machines in Naval Architecture," by A. M. Robb; "A Differentiating Machine," by Dr. J. Erskine Murray; "Tide-predicting Machines," by Edward Roberts; "A Mechanical Aid in Periodogram Work," "A Mathematical Description of Conics" and "The Instrumental Solution of Numerical Equations," by D. Gibb; "Ruled Papers," by E. M. Horsburgh; "Collinear-point Nomograms," by Professor D'Ocagne; "Mathematical Models," by Professor Crum Brown; and "Closed Linkages," by Colonel R. L. Hippisley. Besides these essays, numerous shorter notes appear, all of them written by experts in their fields.

A catalogue of the mathematical portraits in the collection of W. W. Rouse Ball, the well-known writer on the history of mathematics, will prove of value to all collectors.

It is impossible in the space at our disposal to speak in detail of any of the essays, several of them profusely illustrated and all of an authoritative nature. Suffice it to say that

the book should be in every mathematical library and workshop as being the most valuable treatise of its kind that we have in English, and, indeed, about the only one in any language except such as is found in the articles in the German encyclopædia.

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Die Elemente der Entwicklungslehre des Menschen und der Wirbeltiere. Anleitung und Repetitorium für Studierende und Aerzte. VON OSCAR HERTWIG. 5te Auflage. Jena, Gustav Fischer, 1915. Pp. x + 464. 416 figs.

This work, already well known through former editions, must be regarded as among the *opera minora* of its distinguished author. It is professedly a utilitarian text-book, and discussions not adapted to "comprehensive brief presentation, suitable for a text-book," have been omitted. For further information, Professor Hertwig appropriately refers the student to his "Lehrbuch," ninth edition, his "Allgemeine Biologie," fourth edition, and the imposing "Handbuch der Entwicklungsgeschichte der Wirbeltiere," which he edited and to which he contributed important chapters.

The fourth edition of the "Elements" was published in 1910 and the present volume, although reset throughout, contains only minor changes—chiefly such as are designed to make the book more useful to students of medicine. Except that Hochstetter's series of diagrams of the development of the *vena cava inferior* has been replaced by Kollmann's drawings of the same subject, all the figures in the last edition have been republished. To these are added sixteen others, eight of which show young human embryos and their adnexa, three illustrate cleft palate, two pertain to the vascular system, and the remaining three represent the *tunica vasculosa lentis*, the human branchial region and one of Keibel's models of the urogenital tract, respectively. None of the new figures is original, for Professor Hertwig is not of those who, on seeing a good drawing, make another much like it to be called their own. He prefers to present to the students a